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Ureteroscopy for treatment of obstructing ureteral calculi in pregnant women: Single center experience

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KEYWORDS
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Abstract
Objectives: To evaluate our experiences with ureteroscopic treatment of ureteral calculi in pregnancy.
Patients and methods: Between April 2006 and October 2013, 41 pregnant women with persistent renal colics and/or hematuria refractory to conservative measures were treated with ureteroscopy. The patients' mean age was 23 (range 19–37) years. Most of the patients (56.1%) presented in the 2nd trimester. Loin pain and colic were the most common presenting symptoms (90.2%). Twenty-seven patients (65.9%) had an obstruction on the right side. All patients underwent ureteroscopy under epidural anesthesia.
Results: Ureteroscopy revealed the presence of ureteric stones in 36 of the 41 cases. The stone size ranged from 5 to 16 (mean 8.9) mm. Distal ureteric stones were found in 29 patients. The pneumatic lithoclast was used for stone fragmentation in 22 of them (75.9%), while the stone was directly extracted in 4 patients. In 3 patients the stone migrated proximally and was not accessible any more. Proximal ureteric stones were detected in 7 of the remaining 12 cases. When attempting to manipulate these stones, they migrated more proximally and became unreachable. In the last 5 patients the entire ureter was free of stones; they only had edema at the ureteric orifice. A long lasting JJ stent was left until the end of the pregnancy in all cases with migrated inaccessible stones. In all patients successfully treated, a JJ stent with dangle extraction strings was left for two weeks. Minor urologic complications were encountered in the form of mild dysuria in 12 cases (29.2%) and mild hematuria in 5 cases (12.2%). All patients completed their pregnancy until full term without any serious obstetric complications requiring intervention.
Conclusion: Ureteroscopy is a safe and effective therapeutic option for the treatment of obstructing ureteral stones in pregnancy with stone-free and complication rates comparable to the non-pregnant population.

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Introduction

Urolithiasis is the most common cause (after urinary tract infection) of urinary tract-related abdominal pain in pregnant women with a reported prevalence of 1/200–1/2000 women [1–3]. It is assumed that physiological alterations associated with pregnancy, such as urine stasis and hypercalciuria [4] which may be attributed to an increased glomerular filtration rate and increased urinary citrate, magnesium and glycoprotein levels, have an inhibitory and protective effect against stone formation [5]. Nevertheless, there is no difference in the incidence of urolithiasis between pregnant and non-pregnant women.

Ureteral stones are more common than renal pelvic or calyceal stones. Both sides are equally affected and most of the stones are composed of calcium phosphate or calcium oxalate [6]. The majority of pregnant patients with urolithiasis present in the second or third trimester [7,8].

Symptomatic urolithiasis during pregnancy has been reported to be the most common cause of abdominal pain and hospital admission for non-obstetric reasons [9].

Treatment of symptomatic ureteral calculi during pregnancy is mainly conservative in the form of hydration, analgesics, antispasmodics, and antibiotics in cases with associated infection [2]. Failed conservative treatment necessitates definitive stone management, either by insertion of a double-J stent or a nephrostomy tube, or by ureteroscopic manipulation of the stone [10–15]. We herein report on our experiences with ureteroscopic treatment of ureteral calculi in pregnant patients.

Patients and methods

This prospective study conducted at the Urology Department, Minia University, Egypt, between April 2006 and October 2013 included 78 pregnant patients presenting with renal colics with or without hematuria and/or lower urinary tract symptoms (LUTS).

At first, conservative management in the form of hydration, analgesics, antispasmodics and, if needed, antibiotics was attempted for a duration of two weeks. Thirty-seven out of 78 patients (47.5%) responded well to conservative treatment and were thus excluded from the study. The remaining 41 patients who showed no improvement after conservative therapy were subjected to ureteroscopic manipulation.

The patients' mean age was 23 (range 19–37) years. The demographic characteristics of the patients are summarized in Table 1. The symptoms were renal colics in 37 (90.2%) and hematuria in 23 (56.1%) patients.

Laboratory work-up included urine analysis and urine culture, when needed, blood urea, serum creatinine and a complete blood picture in all patients. On admission, the patients were subjected to sonographic examination for the diagnosis of urinary tract obstruction. Further examinations included resistive index (RI) measurements and Doppler ultrasound to differentiate between definitive ureteral obstruction due to calculi and physiologic hydronephrosis. Right-side obstruction was found in 27 (65.9%) and left-side obstruction in 14 patients (34.1%). Neither KUB nor computed tomography (CT) was used to avoid hazards of radiation exposure to the fetus.

Table 1 Patient's demographic characters.

Characterisric	Value
NO	41
Age (YRS)	19–37
Gestational age	
1st trimester	4 (9.8%)
2nd trimester	23 (56.1%)
3rd trimester	14 (34.1%)
Presentation	
Renal colic	37 (90.2%)
hematuria	23 (56.1%)
Stone side	
RT. Ureter	27(65.9%)
LT. Ureter	14 (34.1%)

All patients were subjected to a complete obstetric examination pre- and postoperatively. The study was approved by the hospital ethics committee, and the patients were informed about the nature of the procedure. All patients gave a written consent to the intervention.

They received 2nd generation cephalosporin preoperatively. Epidural anesthesia was used in all cases to avoid risks of general anesthesia.

Ureteroscopy (7.5–8 F) was performed without dilatation using only semirigid ureteroscopes (Karl Storz, Tuttlingen, Germany). Obstetric monitoring was carried out during the whole procedure. Cystoscopy was done to identify the ureteric orifice. The guidewire was advanced through the ureteroscope into the ureteric orifice. The ureteroscope followed the wire up to the site of the stone, then the wire was advanced under vision, past the stone to the kidney. The ureteroscope was then removed and reintroduced beside the wire until it reached the stone. The pneumatic lithoclast was used for stone disintegration, while a basket or grasper was used for stone extraction. After ureteroscopic manipulation, a ureteral stent was left in situ, and its proximal coil was checked by immediate renal ultrasound.

Results

Ureteric stones were found in 36 of the 41 patients. The stone size ranged from 5 to 16 mm (mean 8.9 mm). Distal ureteric stones were found in 29 cases. Pneumatic lithotripsy was used for stone disintegration in 22 cases (75.9%), while the stones were extracted without fragmentation, either by grasper or basket, in 4 cases (13.8%). In 3 cases (10.3%) the stone migrated proximally and became inaccessible.

Proximal ureteric stones were detected in the 7 of the remaining 12 cases. When attempting to manipulate these stones, they migrated more proximally and became inaccessible. In the last 5 patients the entire ureter was free of stones; they only had edema at the ureteric orifice.

As at the time of the study we did not have flexible ureteroscopes or a laser lithotriptor, a long lasting JJ stent (Percuflex^{TM}, Boston Scientific Corp., USA) was left until the end of pregnancy in all cases with inaccessible proximally migrated stones (10 cases). After successful ureteroscopic stone extraction and/or disintegration, a JJ stent was left for two weeks in all patients. The stent was then